Curriculum Vitae

LEONARD JOSEPH TREJO, PH.D.

Address

Office: NASA Ames Research Center, MS 269-3, Moffett Field, CA 94035-1000
Telephone numbers: (650) 604-2187, (650) 604-4036 *fax*
E-mail address: ltrejo@mail.arc.nasa.gov
Home page: http://ti.arc.nasa.gov/ltrejo

Education

1982	Ph.D., Physiological Psychology and Quantitative Methods, University of California, San Diego, CA
1980	M. A., Psychology, University of California, San Diego, CA
1978	Ph. D. Student in Psychobiology, University of Michigan, Ann Arbor, MI
1977	B. S., Psychology, University of Oregon, Eugene, OR

Postdoctoral Training

1991	Adaptive Neural Networks and Adaptive Filters, UCLA, Los Angeles, CA
1987	Digital Signal Processing, Integrated Computer Systems, Culver City, CA
1986	*C* Programming, San Diego State University, San Diego, CA
1982-1985	Neurobiology of vision, intraocular electrophysiology. Departments of Ophthalmology and Biological Structure, University of Washington, Seattle, WA.

Professional Experience and Employment History

2003-	CEO and co-founder, Pacific Development and Technology, LLC.
2000-	Computer Scientist, Neuroengineering and Smart Systems Group, NASA Ames Research Center, Moffett Field, CA
1998-2000	Chief, Human Information Processing Research Branch, NASA Ames Research Center, Moffett Field, CA
1996	Founder, The Human Dynamics Company
1995	Founder, The Internet Psychology Laboratory, University of Illinois at Urbana-Champaign
1994-1997	Assistant Professor, Department of Psychology, University of Illinois at Urbana-Champaign
1984-1994	Research Psychologist, Navy Personnel Research and Development Center, San Diego, CA
1988-1994	Adjunct Associate Professor, Department of Psychology, Point Loma Nazarene College, San Diego, CA
1983	Lecturer, Department of Psychology, University of Washington, Seattle, WA
1982-1984	Postdoctoral Fellowship in Neuroscience, Departments of Ophthalmology and Biological Structure, University of Washington, Seattle, WA

Professional Service

1998-2000	Program Manager, Perceptual and Physiological Stressors and Factors Program, NASA
1995-1998	Member, NIMH Small Business Research Grant Review Committee (MHSB)
1994-1996	Graduate Admissions Committee, Department of Psychology, University of Illinois
1986-1993	Office of Naval Research, Reviewer-Manpower, Personnel, & Technology Program; SBIR Program
1988	Judge, Behavioral Sciences Area, Naval Science and Engineering Awards Program, International Science and Engineering Fair, Ft. Worth, TX

Ad-hoc reviewer for *Psychophysiology.*
Associate for *Brain and Behavioral Sciences.*

Awards, Scholarships, and Honors

1993	Award for Best Independent Research Paper of 1993. Navy Personnel Research and Development Center, San Diego, CA
1990, 1993	Publications Award. Navy Personnel Research and Development Center
1990	Certificate of Commendation, Chief of Naval Research, in recognition of Nomination for Best Navy Independent Research Paper of 1988

1982-1984 NIH National Research Service Award, Department of Ophthalmology, University of Washington
1981-1982 Dissertation Research Fellowship, University of California, San Diego
1980-1981 Minority Biomedical Scholarship, Department of Biology, University of California, San Diego
1978-1979 San Diego Fellowship, Department of Psychology, University of California, San Diego

Organizations

- Charter Member, Society for Psychophysiology in Ergonomics
- Society for Psychophysiological Research

Research Interests

- Human performance assessment, monitoring, and human-computer interaction
- Biomedical signal processing
- Machine learning and pattern recognition
- Brain-computer interfaces
- Sensory, perceptual, and cognitive psychophysiology
- Multimedia, adaptive training and education.

Refereed Articles and Book Chapters

Trejo, L. J., Wheeler, K.R., Jorgensen, C. C., Rosipal, R., Clanton, S., Matthews, B, Hibbs, A. D., Matthews, R., & Krupka, M. (2003). Multimodal neuroelectric interface development. IEEE Transactions on Neural Systems and Rehabilitation Engineering, 11(2), 199-204.

Rosipal, R. & **Trejo**, L. J. (2001). Kernel partial least squares in reproducing kernel Hilbert space. Journal of Machine Learning Research, 2, 97-123.

Rosipal, R., Girolami, M. and **Trejo**, L., Cichocki, A. (2001). Kernel PCA for feature extraction and de-noising in non-linear regression. Neural Computing & Applications, 10(3), 231-243.

Rosipal, R., Girolami, M., & **Trejo**, L. J. (2000, May). Kernel PCA Feature Extraction of Event-Related Potentials for Human Signal Detection Performance. In H. Malmgren, M. Borsa, L. Niklasson (eds.), Perspectives in Neural Computation. Proceedings of the ANNIMAB-1 Conference on Artificial Neural Networks in Medicine and Biology. Goteborg, Sweden, May 13-16, 2000. London: Springer-Verlag.

Trejo, L. J., & Shensa, M. J. (1999). Feature extraction of event-related potentials using wavelets: An application to human performance monitoring. *Brain and Language* **66**, 89-107. Available online at http://www.indealibrary.com (Article ID brln.1998.2026).

Koska, M., Rosipal, R., Konig, A. & **Trejo**, L. J. (1997). Estimation of human signal detection performance from event-related potentials using feed-forward neural network models. In K. Warwick and M. Kárny (Eds.), *Computer intensive methods in control and signal processing: The curse of dimensionality.* Cambridge. MA: Birkhauser Boston, pp. 129-134.

Kramer, A. F., **Trejo**, L. J., & Humphrey, D. (1996). Psychophysiological measures of human information processing activities: Potential applications to automated systems. In R. Parasuraman & J. Mouloua (Eds.), *Automation and Human Performance: Theory and Applications.* Mahwah, NJ: Lawrence Erlbaum Associates, pp. 137-162.

Trejo, L. J., Ryan-Jones, D., & Kramer, A. F. (1995). Attentional modulation of the pitch-change mismatch negativity elicited by frequency differences between binaurally presented tone bursts. *Psychophysiology,* **32**, 319-328.

Trejo, L. J., Kramer, A. F., & Arnold, J. (1995). Event-related potentials as indices of display-monitoring performance. *Biological Psychology,* **40**, 33-71.

Kramer, A. F., **Trejo**, L. J., & Humphrey D. (1995). Assessment of mental workload with task-irrelevant auditory probes. *Biological Psychology,* **40**, 83-100.

Snyder, H. L., & **Trejo**, L. J. (1992). Research Methods. In Widdel, H. (Ed.), *Colour in Electronic Displays.* New York: Plenum Press, pp. 95-135.

Trejo, L. J., Rand, M. N., & Cicerone, C. M. (1989). Consensual pupillary light reflex in the pigmented rat. *Vision Research*, **29**, 303-307.

Trejo, L. J., & Cicerone, C. M. (1987). Changes in visual sensitivity with age in rats with heredity retinal degeneration. *Vision Research,* **27**, 915-918.

Trejo, L. J. (1985). Retinal ganglion cell loss produced by intraocular kainic acid in cats: Variation with somal size and eccentricity. *Brain Research,* **355**, 221-230.

Trejo, L. J., & Cicerone, C. M. (1984). Cells in the pretectal olivary nucleus are in the pathway for the direct light reflex of the pupil in the rat. *Brain Research,* **300**, 49-62.

Trejo, L. J., & Cicerone, C. M. (1982). Retinal sensitivity measured by the pupillary light reflex in RCS and albino rats. *Vision Research,* **22**, 1163-1171.

Technical Reports

Rosipal R., & **Trejo**, L. J. (2001, February). Kernel Partial Least Squares Regression in RKHS. Technical report, CIS Department, University of Paisley, UK.

Rosipal R., **Trejo** L.J., and Cichocki A. (2000). Kernel principal component regression with EM approach to nonlinear principal components extraction. Technical report, RIKEN.

Trejo, L. J., Mullane, M., & Stewart, J. (May, 1995). *Event-related potentials and electroencephalograms in adaptive operator training*. NPRDC Technical Report (TN-95-3). San Diego: Navy Personnel Research and Development Center.

Trejo, L. J., Inlow, M., Stanny, R. R., Morey, W. A., Makeig, S., Kobus, D. A., & Hillyard, S. A. (1991). *The P300 component of the auditory event-related potential: Interlaboratory consistency and test-retest reliability* (NPRDC Technical Report TR-91-6). San Diego: Navy Personnel Research and Development Center.

Ryan-Jones, D. L., Lewis, G. W., **Trejo**, L. J., & Hemmer, J. D. (1990). Brain activity during visual recognition. In W. E. Montague, & C. C. Scheifers, (Eds.), *Independent Research and Exploratory Development Programs: FY89 Annual Report*, (NPRDC Report AP 90-6), pp. 7-20. San Diego: Navy Personnel Research and Development Center.

Trejo, L. J., Lewis, G. W., & Blankenship, M. H. (1990). *Brain Activity during decision-making: III. Relationships between probe-evoked potentials, simulation performance, and on-job performance* (NPRDC Technical Note 90-09). San Diego: Navy Personnel Research and Development Center.

Trejo, L. J., & Lewis, G. W. (1989). Brain mechanisms for human color vision: Implications for display systems. In W. E. Montague, & C. C. Scheifers, (Eds.), *Independent Research and Exploratory Development Programs: FY88 Annual Report*, (NPRDC Report AP 89-7), pp. 18-32. San Diego: Navy Personnel Research and Development Center.

Blankenship, M. H., **Trejo**, L. J., & Lewis, G. W. (1988a). *Brain activity during tactical decision-making: IV. Event-related potentials as indices of selective attention and cognitive workload* (NPRDC Technical Note 89-6). San Diego: Navy Personnel Research and Development Center.

Blankenship, M. H., **Trejo**, L. J., & Lewis, G. W. (1988b). *Brain activity during tactical decision-making: V. A cross-study validation of evoked potentials as indices of cognitive workload* (NPRDC Technical Note 89-7). San Diego: Navy Personnel Research and Development Center.

Trejo, L. J., & Lewis, G. W. (1988b). Brain mechanisms of human color vision-implications for display systems. In W. E. Montague, (Ed.), *Independent Research and Independent Exploratory Development Programs, FY87 Annual Report* (NPRDC Annual Report AP 88-5). San Diego: Navy Personnel Research and Development Center.

Trejo, L. H., Lewis, G. W., & Blankenship, M. H. (1987). *Brain activity during tactical decision-making: II. Probe-evoked potentials and workload* (NPRDC Tech. Note 88-12). San Diego: Navy Personnel Research and Development Center.

Trejo, L. J., & Lewis G. W. (1987). Brain mechanism for human color vision. In A. M. Crawford & M. H. Metcalfe (Eds.), *FY86 Independent Research/Independent Exploratory Development* (NPRDC Special Report 87-1). San Diego: Navy Personnel Research and Development Center.

Trejo, L. J. (1986). *Brain activity during tactical decision-making: I. Hypotheses and experimental design* (NPRDC Tech. Note 71-86-6). San Diego: Navy Personnel Research and Development Center.

Conference Papers

Trejo, L J., Kochavi, R., Kubitz, K., Montgomery, L. D., Rosipal, R., & Matthews, B. (2005, April). EEG-based estimation of cognitive fatigue. Biomonitoring for Physiological and Cognitive Performance During Military Operations, Symposium: OR05 Defense and Security, 28 March-1 April 2005, Orlando (Kissimmee), FL.

Trejo, L. J., Kochavi, R., Kubitz, K., Montgomery, L. D., Rosipal, R., & Matthews, B. (2004, October). Measures and models for estimating and predicting cognitive fatigue. Fourty-fourth Annual Meeting of the Society for Psychophysiological Research, October 20-24, Santa Fe, New Mexico, USA.

Rosipal, R., & **Trejo**, L. (2004, October). Kernel PLS estimation of single-trial event-related potentials. Fourty-fourth Annual Meeting of the Society for Psychophysiological Research, October 20-24, Santa Fe, New Mexico, USA.

Rosipal, R., **Trejo**, L. J., and Matthews, B. (2003, August). Kernel PLS-SVC for Linear and Nonlinear Classification. The Twentieth International Conference on Machine Learning (ICML-2003). Washington, DC.

Rosipal, R., **Trejo**, L. J., Matthews, B, and Wheeler, K. (2003, September). Nonlinear kernel-based chemometrics tools: a machine learning approach. PLS'03. Third International Symposium on PLS and Related Methods. ISEGI – Universidade Nova de Lisboa. Lisbon, Portugal.

Trejo, L. J., Wheeler, K.R., Jorgensen, C. C., Rosipal, R. & Hibbs, A. D. (2002, June). Multimodal neuroelectric interface development. Brain-Computer Interface Technology: Moving Beyond Demonstrations, June 12-16, 2002, Rensselaerville Institute, Rensselaerville, NY.

Trejo, L. J., Johnson, T., & Hyatt, A. (2000, June). Visual-auditory interactions and mismatch negativity: A study of the McGurk effect. Second International Congress on Mismatch Negativity and its Clinical Applications. Barcelona, Spain, June 15-18, 2000.

Rosipal, R., Girolami, M., & **Trejo**, L. J. (2000, May). Kernel PCA Feature Extraction of Event-Related Potentials for Human Signal Detection Performance. In H. Malmgren, M. Borsa, L. Niklasson (eds.), Perspectives in Neural Computation. Proceedings of the ANNIMAB-1 Conference on Artificial Neural Networks in Medicine and Biology. Goteborg, Sweden, May 13-16, 2000. London: Springer-Verlag, 321-326.

Koska, M., Rosipal, R., Konig, A. & **Trejo**, L. J. (1996, June). Estimation of human signal detection performance from event-related potentials using feed-forward neural network models. In K. Warwick and M. Kárny (Eds.), Computer intensive methods in control and signal processing: The curse of dimensionality. Cambridge. MA: Birkhauser Boston, pp. 129-134.

Trejo, L. J., & Johnson, T. M. (1996, October). The MMN is sensitive to perceptual changes in the absence of physical changes in an auditory stimulus. Society for Psychophysiological Research, Thirty-Seventh Annual Meeting. Vancouver, Canada.

Trejo, L. J., & Kramer, A. F. (1995, November). Psychophysiological measurement of situation awareness. International Conference on Experimental Analysis and Measurement of Situation Awareness. Daytona Beach, FL.

Trejo, L. J., & Mullane, M. M. (1995, October). ERPs and visual signal detection Performance: Classification functions based on wavelet decompositions. Society for Psychophysiological Research, Thirty-Fifth Annual Meeting, Toronto, Canada.

Trejo, L. J., & Shensa, M. J. (1993). Linear and neural network models for predicting human signal detection performance from event-related potentials: A comparison of the wavelet transform with other feature extraction methods. *Proceedings of the Fifth Workshop on Neural Networks: Academic/Industrial/NASA/Defense, SPIE Volume 2204* (pp. 153-161). San Diego: Society for Computer Simulation.

Trejo, L. J., & Shensa, M. J. (1993). Pattern recognition neural networks for human event-related potentials (ERP): A comparison of feature extraction methods. In J. I. Borack (ed.), *Applications of Artificial Neural Networks and Related Technologies to Manpower, Personnel, and Training (Report No. AP-93-10). San Diego: Navy Personnel Research and Development Center.*

Trejo, L. J., Ryan-Jones, D., & Kramer, A. F. (1992, October). Attentional modulation of the pitch-change mismatch negativity. Society for Psychophysiological Research, Annual Meeting, San Diego, CA.

Trejo, L. J., Kramer, A. F., & Humphrey, D. (1992, October). Differential workload sensitivity of early and late components of the auditory probe ERP. Society for Psychophysiological Research, Annual Meeting, San Diego, CA.

Blankenship, M. H., **Trejo**, L. J., Lewis, G. W., & Sorenson, R. C. (1992, October). P300 and dual-task mental workload assessment: Increased workload sensitivity after removing N1 covariance. Society for Psychophysiological Research, Annual Meeting, San Diego, CA.

Trejo, L. J. & Kramer, A. F. (1992, June) ERP indices of performance quality in signal detection, running memory, and computation. Fourth Annual Convention of the American Psychological Society. San Diego, CA.

Trejo, L. J., Lewis, G. W., & Kramer, A. F. (1991, October). ERP indices of human performance: effects of stimulus relevance and type of information processing. Society for Psychophysiological Research, Annual Meeting. Chicago, IL.

Kaylani, T., Mazzara, M., DasGupta, S., Hohenberger, M., & **Trejo** , L. J. (1991, February). Classification of ERP signals using neural networks. *Proceedings of the Second Workshop on Neural Networks: Academic/Industrial/NASA/Defense,* pp. 737-742. Space Power Institute: Auburn, AL.

DasGupta, S., Hohenberger, M., **Trejo**, L. J., & Mazzara, M. (1990, February). Effect of using peak amplitudes of ERP signals for a class of neural network classification. *Proceedings of the First Workshop on Neural Networks: Academic/Industrial/NASA/Defense,* pp. 101-114. Space Power Institute: Auburn, AL.

DasGupta, S., Hohenberger, M., **Trejo**, L., & Kaylani, T. (1990, April). Effect of data compression of ERP signals preprocessed by FWT algorithm upon a neural network classifier. *Proceedings of the 23rd Annual Simulation Symposium.* Nashville, TN.

Lewis, G. W., **Trejo**, L. J., Inlow, M., & Blankenship, M. H. (1989, October). Short term changes in the neuromagnetic evoked field. 19th Annual Meeting of the Society for Neuroscience. Phoenix, AZ.

Trejo, L. J., & Lewis, G. W. (1989, October). Individual differences in classification of transient, isoluminant, chromatic signals: A behavioral and electrophysiological analysis. Annual Meeting of the Optical Society of America. Orlando, FL.

Lewis, G. W., **Trejo**, L. J., Naitoh, P., Blankenship, M. H., & Inlow, M. (1989). Temporal variability of the neuromagnetic field: Implications for human performance measurement. In Williamson, S. J., Hoke, M., Stroink, G., & Kotani, M. *Advances in Biomagnetism,* pp. 217-220. New York: Plenum Press.

Trejo, L. J., & Lewis, G. W. (1988a). Sensitivity to hue differences measured by visual evoked potentials. In D. Eggleson, (Ed.), *First Navy Independent Research/Independent Exploratory Development Symposium*, Volume 1 (CPIA Publication 492), pp. 309-316. Laurel, MD: Chemical Propulsion Information Agency.

Lewis, G. W., **Trejo**, L. J., Nunez, P., Weinberg, H., & Naitoh, P. (1988). Evoked neuromagnetic fields: Implications for indexing performance. In K. Atsumi, T. Katila, M. Kotani, S. J. Williamson, & S. Ueno (Eds.), *Biomagnetism 1987. Proceedings of the Sixth International Conference on Biomagnetism*. Tokyo: Tokyo Denki University Press, pp. 266-269.

Lewis, G. W., **Trejo**, L. J., Blackburn, M. R. & Blankenship, M. H. (1986). Neuroelectric and neuromagnetic recordings: possible new predictors of on-job performance. In G. E. Lee (Ed.), *Proceedings: Psychology in the Department of Defense*, *Tenth Symposium* (USAFATR 86-1). Colorado Springs: U. S. Air Force Academy.

Trejo, L. J. (1983). Selective neurotoxic effects of kainic acid upon cat retinal ganglion cells. *Invest. Ophthalmol. Vis. Sci. Suppl* . **24**, 261.

Trejo, L. J., & Cicerone, C. M (1981). Asymmetry of ON and OFF cell responses in pupillary light reflex pathways of the rat. *Invest. Ophthalmol. Vis. Sci. Suppl*. **20**, 15.

Trejo, L. J., & Cicerone, C. M. (1979). The pupillary light reflex in rats with hereditary retinal degeneration. Optical Society of America, Annual Meeting, Rochester, NY.

Trejo, L. J., & Cicerone, C. M. (1978). Pupillary light reflex shows shift from photopic to scotopic spectral sensitivity with age in rats (RCS) with retinal dystrophy. *Invest. Ophthalmol. Vis. Sci. Suppl.,* 114.

Invited Presentations and Workshops

Viva Technology Program, Tennyson High School, Hayward, CA. (2004, May). Invited educational outreach presentation on career development and motivation for high school students.

Signal Processing and Machine-learning Algorithms for Brain-Computer Interfaces. (2003, July). Invited seminar. Redwood Neuroscience Institute. Menlo Park, CA.

Signal Processing and Machine-learning Algorithms for Brain-Computer Interfaces. (2003, April). Invited seminar. University of California, Santa Cruz, Department of Applied Mathematics and Statistics.

ERPs and EEGs for Personnel Assessment: Reality or Fantasy? (1996, June). Invited speaker. ICON VI. Sixth International Cognitive Neuroscience Meeting. Asilomar, CA

Applications of wavelets to on-line measurement and classification of event-related potentials. (1996, January). Invited speaker. University of Oregon, Department of Psychology, Eugene, OR.

Physiological Measurement Techniques (1995, November). Invited panelist. International Conference on Experimental Analysis and Measurement of Situation Awareness, Daytona Beach, FL.

Event-related potentials, EEG and mental workload estimation: Bridging the gap between the laboratory and the workplace (1995, October). Invited panelist, Symposium on Recent Advances in the Psychophysiology of Mental Workload. Society for Psychophysiological Research, Thirty-Fifth Annual Meeting, Toronto, Canada.

Quantitative relationships between event-related potentials and human performance (1993, November). Invited participant, EEG in Basic and Applied Settings Meeting, Air Force Human Engineering Laboratory, Dayton, OH.

Predicting human performance from EEG and event-related potentials (1993, November). Plenary address, 1993 International Simulation Technology Multiconference. San Francisco, CA.

Wavelet analyses of brain activity and cognition (1993, October). Invited participant, Third Meeting on Neural Constraints on Cognitive Architectures, Office of Naval Research and Learning Research and Development Center, University of Pittsburgh, Pittsburgh, PA.

Applications of event-related potentials to performance assessment (1993, April). Invited address, Department of Psychology, University of Illinois, Champaign, IL.

An overview of human performance research at the Navy Personnel Research and Development Center (1991, February). Plenary talk, Second Workshop on Neural Networks--Academic / Industry / NASA / Defense. Auburn University, Auburn, AL.

Analysis of human brain electrical activity: Towards real-time prediction of human performance (1989, October). Invited address, Department of Electrical Engineering, Temple University, Philadelphia, PA.

Individual differences in visual evoked potentials at isoluminance (1987, April). Invited address, Department of Psychology, University of California, San Diego, CA.

Brain mechanisms of human color vision: Implications for display systems (1987, September). Invited address, Human-computer interaction Group, Naval Research Laboratory, Washington, DC.

Retinal ganglion all loss produced by intraocular kainic acid in cats; variation with somal size and eccentricity (1984, June). Invited address, Neurological Sciences Institute, Portland, OR.

Research Funding and Management History

2004- Principal Investigator Embedded Real-Time Advisory System for Crew-Automation Reliability (ERTAS), Advanced Space Technology Program; Software, Intelligent Systems and Modeling Element; Exploration Systems Research and Technology (ESR&T) Program $5M.
2001- Principal Investigator, Multimodal Human-Computer Interface Development, Human Centered Computing Project, Intelligent Systems Program, NASA, Funding $200K
2001- Principal Investigator, Brain-Computer Interface Development, DDF Program, NASA, Funding $45K
2000- Principal Investigator, Biolectric Technologies for Human Performance Optimization, Perceptual and Physiological Stressors and Factors Program, NASA. Funding: $100K
1998- Program Manager, Perceptual and Physiological Stressors and Factors Program, NASA. Funding: $5M
1996-1997 Principal Investigator: *Human-Computer Interaction*. (Lockheed-Martin Corporation). Funding: $10K
1996-1997 Principal Investigator: *Internet Psychology Laboratory.* (University of Illinois, Learning Technologies in Higher Education Program). Funding: $83K (Phase 1); $40K (Phase 2).
1996-1997 Consultant: *Brain-Computer Interface.* (Human Dynamics subcontract to Bio-Logic Corporation; funded by NIMH Small Business Technology Transfer Program). Funding: $100K (Phase 1).
1995-1996 Principal Investigator: *Brain Mechanisms of Selective Attention* (University of Illinois, Research Board and Department of Psychology). Funding: $99K.
1993-1994 Principal Investigator: *Neural Human Systems Interfaces* (US Navy, Office of Naval Research, PE 60233N). Funding: $250K.
1991-1994 Principal Investigator: *Brain Mechanisms and Cognition: Advanced Signal Analysis using the Wavelet Transform* (US Navy, Office of Naval Research, PE 60115N). Funding $75K. (FY92), $79K (FY93), $80K (FY94).
1988-1992 Principal Investigator: *Biopsychometric Assessment of Combat Operations* (US Navy, Office of Naval Technology, PE62234N, Project RS34H21). Funding: $1.2M (FY88), $1.4M (FY89), $1.3M (FY90), $800K (FY91).
1988-1991 Associate Investigator: *Marine Corps Biopsychometrics* (US Marine Corps, Headquarters Marine Corps, PE62131M, Project CF31P14). Funding $200K (FY88), $175K (FY89), $275K (FY90).
1988-1990 Associate Investigator: *Brain Mechanisms of Visual Recognition* (US Navy, NPRDC, Independent Research/Independent Exploratory Development Program). Funding $60K (FY89), $50K (FY90).
1986-1988 Principal investigator: *Brain Mechanisms of Human Color Vision: Implications for Display Systems* (US Navy, NPRDC, PE61152, Work Unit 2R000104209.028). Funding: $60K (FY86), $55K (FY87), $55K (FY88).
1986-1988 Associate (1986) and principal (1987) investigator: *Future Technologies-Biopsychometrics* (US Navy, Office of Naval Technology, PE62233N, Project RM3320). Funding $290K (FY86), $340K (FY87).
1986 Associate investigator: *Neuroelectric Assessment System* (US Navy, NMRDC, PE62763N, Work Unit 528-001-002). Funding, $120K (FY85).

Teaching Experience

Sensation and perception

- 1996 Psychology 199, Music in the Mind and the Brain, University of Illinois
- 1995-1996 Psychology 396, Laboratory in Perception
- 1994-1996 Psychology 493, Perception and Performance, University of Illinois
- 1994-1997 Psychology 230, Perception and Sensory Processes, University of Illinois
- 1989-1992 Psychology 412, Sensation and Perception, Pt. Loma Nazarene College
- 1979-1982 Psychology 102, Sensation and Perception, UCSD

Psychology of learning

- 1993-1994 Psychology 409, Psychology of Learning, Pt. Loma Nazarene College

Human factors in human-machine systems

- 1994-1995 Psychology 258, Human Factors in Human-Machine Systems, University of Illinois

Psychophysiology

- 1995-1996 Psychology 493, Psychophysiology of Attention, University of Illinois
- 1994-1995 Psychology 493, Psychophysiology Training, University of Illinois
- 1983 Psychology 403, Physiology of Human Color Vision, University of Washington